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Aging and the politics of the welfare state in OECD countries

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Abstract

Analyzing 30 OECD-countries in 1980-2005, this paper documents the effect of an aging electorate on pension expenditure. The first outcome is that an increase in the age of the median voter leads to less generous pension benefits. The second outcome is that an older median voter is not significantly associated with an increase in pension expenditure relative to GDP. These results do not change when health care costs are considered instead of pension expenditure. The results contradict the main prediction of median voter models that an older median voter will successfully push for higher individual benefits. An alternative specification with the dependency ratio as the operationalization of aging, does show a positive and significant effect of aging on pension expenditure. A positive effect of aging on the generosity of pensions can however also not be found in this case.

JEL classification: C23; H55; J18

Key words: aging; retirement; political economy

I. Introduction

Aging has called the financial sustainability of publicly financed pension arrangements into question (Castles (2004)). This has become more pressing with the credit crisis, in which the health of public finance deteriorated. There are two analytically distinct ways in which aging may positively influence pension expenditure.

The first effect is that there are more retirees on the receiving end of Social Security. As a result, aging naturally leads to higher total pension expenditure. This upward effect on pension expenditure can only be counterbalanced by a considerable decrease of benefits per retiree. A second effect of aging is that there are more older voters; retirees thus have more political influence. Median voter models in particular postulate that an older median voter will successfully push for more generous pension benefits (Galasso (2006), Persson and Tabellini (2000)). Aging will then not only lead to higher total spending but also to higher expenditure relative to the number of retirees.

Using OECD data from 30 countries between 1980 and 2005, this paper tests the median voter hypothesis that an older median voter leads to more generous pension benefits. The effect of an older median voter on pension expenditure relative to GDP is considered as well. Additionally also the association between aging and health care costs is considered. Aging is frequently assumed to be positively associated with health care costs, as elderly need health care relatively more than younger people do.

Only public spending is taken into account here, disregarding savings via pension funds, insurance companies and banks. We focus on the political pressure to increase pensions theorized to arise from an older electorate. As governments can influence public spending directly, public pension spending should be first and foremost affected if such political pressure indeed exists.

All estimates result from a fixed effect model controlling for several economic and political covariates, including unemployment, GDP per capita, union density, the

interest rate and type of government. We do not find empirical support for the median voter hypothesis. In fact we find the opposite: aging influences the generosity of individual benefits negatively and significantly in the baseline regression. In some alternative specifications the effect is insignificant and still negative. An older median voter is also not associated with higher health care costs.

We do find some though not conclusive empirical support for the proposition that aging leads to more public spending as a share of GDP. In the baseline regression an increase of the median age does not lead to an increase in public spending as a share of GDP. In several alternative specifications there is however a positive and significant association. Aging has a positive effect when time effects are discarded or when aging is operationalized with the dependency ratio instead of the age of the median voter.

Several earlier papers have investigated the relationship between aging and retirement spending. Breyer and Craig (1997) use OECD-data for 20 countries in 1960-1990 with 10-year intervals and find that benefits as a fraction of GDP are positively and significantly related to the median voter age. Depending on the specification, an increase of one year of the latter increases spending relative to GDP by 0.4-0.6 percentage points. The median age is positively but not significantly related to benefits per pensioner. Tepe and Vanhuysse (2010) reach the same conclusions based on 18 countries between 1980 and 2000 using eight-year intervals. They operationalize aging with the dependency ratio instead of the age of the median voter. Here both are considered. A controversial claim is made by Razin, Sadka and Swagel (2002) stating that a higher dependency ratio is associated with lower pension contributions. This has been challenged by Disney (2007) and Sanz and Velazquez (2007) who criticize both the (static) model specification and the operationalization of aging and social security (which also includes unemployment benefits).

Shelton (2008) re-estimates the model of Razin et al.. The most important difference is that he uses the number of people over 64 divided by the number of

people between 15-64 as the dependency ratio. Depending on the specification a higher dependency ratio has a positive and significant effect on per capita transfers while the dependency ratio is insignificant in a more elaborate model. The difference between Shelton and this study is first that the latter considers benefits per retiree as the dependent variable (instead of transfers per capita). The second difference is that Shelton does not include time effects, political control variables (union density and government features) or the interest rate while the model here does not include openness of the economy (a variable that Shelton includes).

Mulligan, Gil and Sala-i-Martin (2002) have a somewhat different approach. They show that democracies do not spend more on social security than undemocratic countries. They conclude that for social security "much more important are economic and demographic variables, such as the aging of the population and economic growth."

Our contribution to this literature is twofold. First, we incorporate more recent data and consider relevant regressors not used earlier. We also use more observations than is common in the literature. This paper has a minimum of 109 observations whereas Breyer and Craig and Tepe and Vanhuysse have a maximum of 76 and 54 observations respectively. This elaborated, respecified and updated approach generally confirms earlier findings, thereby strengthening these previous conclusions. This is all the more relevant because aging is a relatively recent phenomenon that by its nature increases gradually over time. Our data thus include observations with a median age higher than found in earlier studies.

The second and novel contribution is that we also evaluate health care costs. Health care costs are not incorporated in the aforementioned literature but are often argued to be related to aging as well. Older voters may be interested in higher health care spending, in much the same way as they are in higher pension benefits. A full analysis considers both factors, or as Tepe and Vanhuysse state: "Recent studies indicate that elderly voters actually care less about the real value of their pensions than

about health issues. Future research could therefore usefully analyze the effects of population aging on health care spending." We do exactly that.

The rest of this paper is organized as follows. The next section discusses the theoretical literature on Social Security and in particular the predicted effect of a greying median voter on benefits. The third section discusses the data and the model. The fourth section shows the results whereas the fifth section considers several extensions and robustness analyses. The sixth section concludes.

II. Theoretical background and related literature

There is a well-developed and substantial theoretical literature on the political economy of social security, see Galasso (2002) and Breyer (1994) for still up-to-date overviews. An important and dominant approach is the median voter model (Browning (1975), Persson and Tabellini (2000), Galasso (2006), Conesa and Krueger (1999) and Cooley and Soares (1999)).

In median voter models aging generally has two opposing effects on the preferences of the decisive median voter. A first, economic effect is that the rate of return of a Pay-as-you-go system decreases, as the ratio between workers and retirees decreases. This will make a PAYG-system less attractive for all voters, including the median voter. A second, political effect is that the median voter will be older. He or she will thus be more and more inclined to support more generous pension benefits. If elections take place once and the outcome thereof remains in effect forever after, this political effect outweighs the economic effect and an older median voter will successfully push for higher benefits (Browning (1975) and Persson and Tabellini (2000)). The crucial implication of median voter models is thus that benefits will become more generous as the median voter ages, or as Persson and Tabellini state: "A social planner, for example, would also spend more on pensions with a larger number of

elderly people. The model really predicts that pensions per retiree will be higher, the higher the weight on old voters (..), as this shifts the median-voter equilibrium toward a more generous pension system."

This result hinges on the assumption that elections take place once and the resulting outcome is binding forever after. This assumption is however counter-factual as policies change over time. Alternatively, Sjoblom (1985), Conesa and Krueger (1999) and Cooley and Soares (1999) understand PAYG arrangements as an intergenerational game where elections take place each period. In this case multiple equilibria arise. If voters do not expect that their contributions will influence future contributions made to them, they will not contribute. A self-rationalizing equilibrium with zero contributions may then result; if no future generation contributes, it is best to do likewise. Positive transfers can still be supported by the threat that future generations will withhold future contributions if current working generations do not contribute to current retirees. Each generation then contributes in favor of retirees, because this results in future generations contributing likewise. In the resulting equilibrium, each generation takes into account the behavior of previous generations in a reaction function. This reaction function gives the current contribution as a function of contributions of previous generations and it can be interpreted as a social contract between generations (Sjoblom (1985), Boldrin and Rustichini (2000)). Any transfer scheme that outperforms the default option of zero contributions and zero benefits can subsequently result as a subgame perfect equilibrium.

When elections take place each period, the effect of aging on pension expenditure is not clear a priori as multiple equilibria are possible. However, if an effect is predicted, the aforementioned median voter reasoning is applied with an older median voter leading to increased pension contributions and benefits. Galasso (2006) for example predicts a dramatic increase in pension spending: Spain will increase its

spending on social security from 21.3% of wages to 45.5% in 2050 and the UK from 14.5% to 33.2%.

Aging may also simultaneously increase contributions and decrease benefits. That is, the 'burden of aging' is shared between working and retired generations. This is the main outcome of Breyer and Stolte (2001). In their OLG-model, the retired generation forms a majority, holding all political power. This does not lead to contributions of 100% because young generations respond to higher taxation by decreasing their labor supply. The older generations effectively maximize a Laffer curve that gives total tax revenues as a function of the tax rate. Breyer and Stolte predict that aging leads to both higher contributions and lower individual benefits. The combination of higher contributions and lower benefits is also the outcome of probability voting models. In these models the incumbent party maximizes political support by maximizing the sum of utility of different cohorts, weighing utility proportional to cohort-size, see Gonzales-Eiras and Niepelt (2007). Probability voting models thereby take the position that larger cohorts have more influence but that minorities are not politically powerless. It also allows for the possibility that pension policy is not the only factor that voters consider in their voting decision.

Yet another view is given by Boldrin and Rustichini (2000), who propose that aging leads to the break-down of social security altogether. Aging makes PAYG less and less attractive and at one point working generations will stop contributing to social security. Key in their two-period OLG-model is that this moment of break-down is uncertain because future demographic developments are uncertain. Each generation has the choice to continue social security, facing ex-ante a positive probability but not the certainty that the next generation will do the same. The last contributing generation will lose ex post, because older generations are not compensated. In this approach aging leads to a definite breakdown of social security at an indefinite moment. As no social

security system has been totally dismantled in an OECD-country, this prediction cannot be confirmed (though it can also not be ruled out that this scenario awaits).

III. Data and econometric model

All data are retrieved from publicly available sources of the OECD, the World Bank and the Comparative Political Data Set.[1] Table 1 provides descriptive statistics.

Table 1.

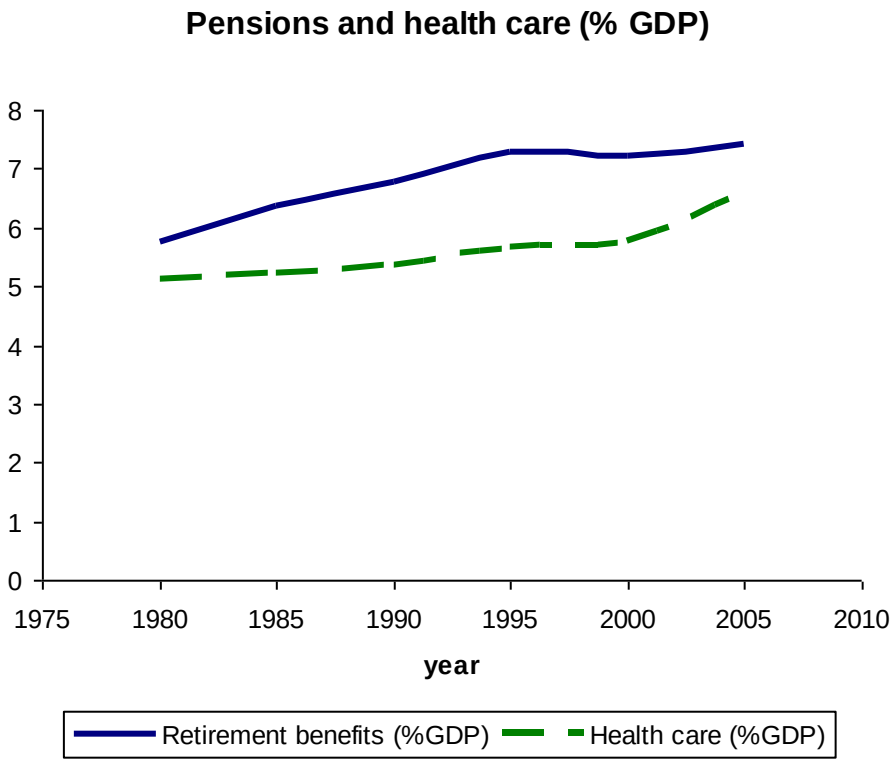
	Mean	Standard deviation	Minimum	Maximum
Retirement spending / GDP	6.23	2.74	0.1	12.60
Benefit / retiree	10020.84	4808.92	312.20	26221.99
Health / GDP	5.57	1.07	3.13	8.24
Health / inhabitant	1350.38	536.06	308.57	4186.19
Median age	34.20	4.89	17.43	43.10
Dependency	21.81	5.38	7.58	32.55
Unemployment	6.72	3.78	0.18	18.76
GDP per capita	21310.02	8401.05	4865.44	59888.22
Union density	39.99	20.62	8.01	86.62
Interest rate	8.72	4.45	1.35	29.03
Government ideology	2.48	1.55	1	5
Minority government	0.16	0.37	0	1
Single party government	0.29	0.46	0	1

The median age of the electorate is proxied by the median age of the whole population, as reported by the World Bank. This data limitation is recognized, however both median ages are driven by the same two factors, namely fertility rates and mortality rates.

In total four different dependent variables are considered. The first measure of pension expenditure is total expenditure relative to GDP. This ranges between 0.1% and 12.1%. The following graph gives the average expenditure relative to GDP for the 21

[1] www.oecd.org, www.worldbank.nl and Armingeon, Engler, Potolidis, Gerber and P. Leimgruber (2010)

countries for which this figure is available in each year.[2] The graph also gives health care spending as a share of GDP for the same countries.

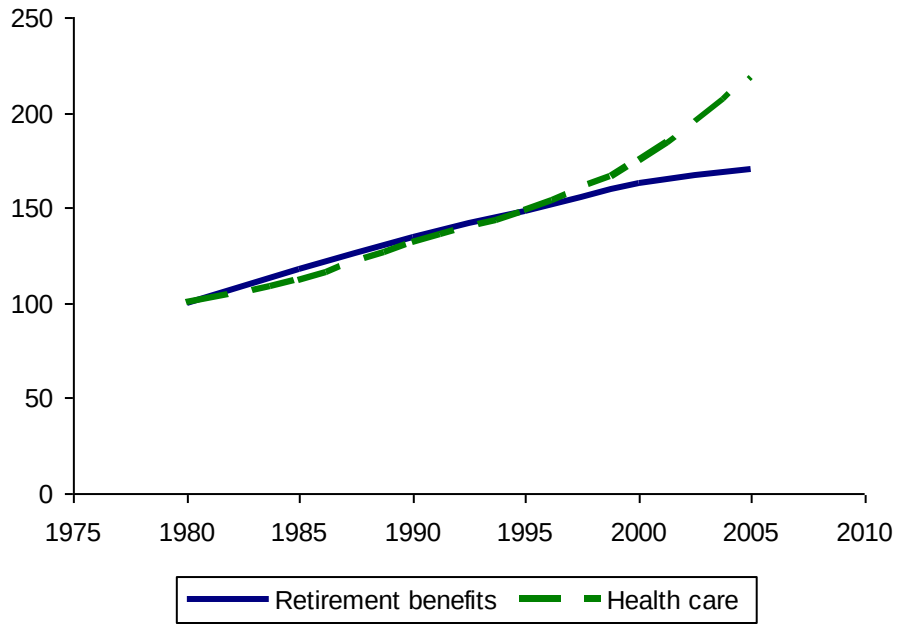


A second measure is benefits per retiree. This figure is derived by dividing total expenditure by the number of people older than 64. This is an approximation as it does not take account of differences in the retirement-age. The exact number of retirees in countries is however unavailable. The number of people over 64 is the best approximation available but it is a data limitation all the same. This indicator is also used in other studies on the effects of aging. The next graph provides the development of

[2] The entire sample of 30 countries consists of Australia*, Austria*, Belgium*, Canada*, Czech Republic, Denmark*, Finland*, France*, Germany*, Greece*, Hungary, Ireland, Iceland*, Italy*, Japan*, Korea, Luxembourg*, Mexico, Netherlands*, New Zealand*, Norway*, Poland, Portugal, Slovak Republic, Spain*, Sweden*, Switzerland*, Turkey, United Kingdom*, United States*. For the 21 countries denoted * data are available for the entire period.

individual benefits for the same 21 countries for which these numbers are available each year; 1980 is the baseline year, indexed 100. It also gives the development of health care costs per inhabitant.

Pensions per retiree and health care per person (1980=100)



The third variable is health care costs relative to GDP, while the fourth dependent variable is health care costs per inhabitant. Health care costs per retiree are not separately available and can thus not be considered. Meara et al. (2004) find for the USA that per person spending developed differently over time. In 1963-1987 spending per person increased relatively faster for persons over 64 years; in 1987-2000 the costs for this age group relatively declined compared with the age group of 35-44 years. For other countries cohort-specific health care spending is not available. The resulting limitation of using health care costs per inhabitant is acknowledged. However this need

not be problematic as health care spending is difficult to target at a specific group. If retirees successfully plead for higher health care spending, this will thus lead to more health care available for all voters alike. Whether other age groups make use of increased health care possibilities is another issue.

The regressors can be grouped in economic and political control variables. Unemployment and the interest rate are economic control variables indicating the economic and financial circumstances of a country respectively. High unemployment arguably decreases the scope for social security while a high interest rate hinders debt-financing of retirement expenditure. The effect of GDP per capita is less straightforward. If pensions are indexed to GDP, GDP does not affect pension expenditure relative to GDP. If this is not the case and benefits increase less than GDP, higher GDP is associated with lower pension expenditure as a share of GDP. There may also be a political effect, when higher GDP makes it politically easier to redistribute; this would lead to a positive effect of GDP on pension benefits.

Political factors other than the age of the median voter are potentially important. The first factor considered is union density, ranging from 8% to 86%. A strong union may successfully press for higher benefits for their (former) members. A government of left-wing signature may likewise lead to higher benefits. The ideological signature of the government is indicated by the proportion of the government that is made up of left-wing parties. There were 59 governments that were exclusively made up of right-wing parties whereas 26 governments consisted solely of left-wing parties. We further include dummy variables for two features of the government. A first dummy indicates whether the government consists of a single party. Such a government may be either more effective in pushing through its own agenda or may shy away from unpopular policy changes as blame cannot be shared with other parties. A second dummy indicates whether the government is a minority government or not. A government without a majority in parliament may be less effective in pushing through

its own preferred policy. Finally, time effects are considered by a dummy for each time period, with the first time period (the year 1980) as the reference category.

The period 1980-2005 is chosen solely for practical considerations of data availability. Five-year intervals are considered instead of one year intervals, the reason being that pension reforms need time to be developed, discussed and implemented and reforms are thus not implemented yearly. A five-year period is chosen because that covers a political cycle in which one (or more) reform(s) can take place. There is also a practical reason to dismiss one year intervals. The median age hardly changes one year to the next and estimation results would therefore not be robust.

The econometric model used is a panel data model with fixed effects, and the coefficients are estimated with the within-estimator. Pooled regression leads to an inconsistent estimator whenever time-invariant country-specific effects (like habit formation, geography, culture, path-dependent policies) correlate with covariates. Exactly the same holds for the random effects model. For non-experimental data fixed effects are thus more reasonable that the random effects. If the crucial assumption that fixed effects are uncorrelated with all regressors does hold, the fixed-effect estimator used here is still unbiased and consistent, but less efficient than the random effects estimator.

The base-line regression model is then given by the following equation:

$$y_{i,t}=\alpha_i+\beta_1 Medianage_{i,t}+\beta_2 Unemployment_{i,t}+\beta_3 Interest\ rate_{i,t}+$$
$$\beta_4 GDP\text{-}per\text{-}capita_{i,t}+\beta_5 governmentideology_{i,t}+\beta_6 Minority\ government_{i,t}+\beta_7 Single\text{-}party\text{-}$$
$$government_{i,t}+\sum_{j=1}^{5}\gamma_j I_{\{t=1980+5j\}}+\varepsilon_{i,t} \qquad i=1,2,..,30,\ t=1980,\ 1985,..,2005$$

Here $y_{i,t}$ is one of the four dependent variables that were discussed. The period-dummies for 1985 until 2005 are given by indicator functions; the year 1980 is the

reference category. For health care costs time effects can be interpreted as technological change that improves medical care but also increases medical spending.

In principle the data cover 30 countries over 6 periods, leading to potentially 180 observations. A considerable amount of observations are however missing, in particular from former Communist countries prior to 1990. The base-line model is estimated using 109 observations. This leads to an (unavoidable) loss in efficiency of the estimators. There is no reason to assume that the missing observations are correlated with the effect we are interested in, so we do not consider it likely that the estimators are biased.

IV. Results

The median age negatively affects the level of individual benefits and this effect is significant; the associated t-statistic equals -3.36. The R^2 equals 0.81; while this is high, not too much can be inferred from it. There is no statistical theory underlying R^2 and it increases when-ever more variables are included, irrespective of their relevance. The regression shows no evidence for the claim of median voter models that an older median voter successfully presses for higher pension spending. In fact, it shows quite the opposite.

The median age does not significantly affect spending as a share of GDP, as Table 2 indicates. The estimated effect itself is positive and an increase of one year is associated with an increase of 0.13 percentage point of GDP. The R^2 equals 0.52, which is fairly high.

Table 2.

VARIABLES	Benefits / retiree	Pension expenditure /GDP
Median age	-0.052***	0.134
	(0.015)	(0.113)
Unemployment	0.008	0.121**
	(0.007)	(0.049)
GDP per capita	0.761***	-1.113
	(0.182)	(1.329)
Union density	0.007***	0.043**
	(0.002)	(0.017)
Government ideology	-0.007	-0.038
	(0.009)	(0.069)
Minority government	-0.092**	-0.663**
	(0.040)	(0.294)
Single government	0.036	0.238
	(0.042)	(0.304)
Interest rate	0.004	0.010
	(0.008)	(0.057)
Year 1985	0.166***	0.356
	(0.053)	(0.385)
Year 1990	0.254***	0.777
	(0.073)	(0.531)
Year 1995	0.373***	1.061
	(0.103)	(0.754)
Year 2000	0.500***	1.548
	(0.129)	(0.941)
Year 2005	0.592***	1.767
	(0.154)	(1.127)
Constant	2.806	9.640
	(1.905)	(13.92)
Observations	109	109
R-squared	0.519	0.519
Number of countries	21	21

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The effect of other covariates varies. Union density is positively and significantly associated with both generosity of pensions and pension expenditure relative to GDP. This indicates that strong unions can bargain for higher pensions for employees. The

effect is quite substantial; the difference between no unions (that is, a membership of 0%) and full unionization (100%) is five percentage points of GDP worth of pension expenditure.

Unemployment affects expenditure relative to GDP positively and significantly. It has to be noted that unemployment is potentially endogenous; this potential problem is addressed below by taking the lagged value of unemployment. A minority government spends less on pensions as a share of GDP whereas GDP per capita positively influences the size of individual benefits. For the latter the effect of GDP per capita (0.76) is interesting; this indicates that if total production per inhabitant increases with 1%, benefits of retirees increases with 0.76%. Both regressions show a positive time trend in retirement spending -indicated by the coefficients of the time-dummies- though this is only significant for the regression with benefits per retiree as the dependent variable.

Table 3 provides regressions with health care costs as the dependent variable. The effect of the median age on health care costs relative to GDP is positive yet insignificant. The same holds for health care costs per inhabitant. Taking the dependency ratio instead of the median age as the operationalization of aging leads to similar conclusions.

Table 3.

VARIABLES	Health/ inhabitant	Health/GDP	Health/ inhabitant	Health/GDP
Median age	0.006	0.054		
	(0.014)	(0.076)		
Dependency ratio			-0.001	0.003
			(0.005)	(0.030)
Unemployment	-0.016***	-0.093***	-0.016***	-0.095***
	(0.006)	(0.033)	(0.006)	(0.033)
GDP per capita	0.381**	-3.353***	0.374**	-3.346***
	(0.160)	(0.892)	(0.167)	(0.933)
Union density	-0.005**	-0.024**	-0.005**	-0.024**
	(0.002)	(0.011)	(0.002)	(0.011)
Government ideology	-0.004	-0.020	-0.004	-0.021
	(0.008)	(0.047)	(0.008)	(0.047)
Minority government	-0.071**	-0.408**	-0.073**	-0.408**
	(0.035)	(0.197)	(0.036)	(0.203)
Single government	0.014	0.011	0.011	-0.006
	(0.037)	(0.204)	(0.037)	(0.204)
Interest rate	0.018**	0.090**	0.018**	0.090**
	(0.007)	(0.038)	(0.007)	(0.038)
Year 1985	0.107**	0.513*	0.115***	0.591**
	(0.046)	(0.258)	(0.042)	(0.235)
Year 1990	0.197***	0.976***	0.214***	1.117***
	(0.064)	(0.356)	(0.054)	(0.304)
Year 1995	0.363***	1.817***	0.387***	2.022***
	(0.091)	(0.506)	(0.076)	(0.423)
Year 2000	0.447***	2.184***	0.480***	2.454***
	(0.113)	(0.631)	(0.093)	(0.522)
Year 2005	0.641***	3.269***	0.683***	3.605***
	(0.136)	(0.756)	(0.110)	(0.613)
Constant	3.000*	36.910***	3.273*	38.580***
	(1.677)	(9.342)	(1.704)	(9.516)
Observations	109	109	109	109
R-squared	0.918	0.622	0.918	0.620
Number of countries	21	21	21	21

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

V. Alternative specifications and robustness checks

The models estimated so far rest on several assumptions and operationalizations for which there are sensible and defensible alternatives. Therefore this section considers several alternatives for the baseline model to assess whether the results are robust with respect to changes in the model set-up. The results are given in Table 4.

The median age of the population increases over time and thus correlates with the time effects. The resulting multicollinearity increases standard errors and may obscure a significant effect. When the baseline regression is estimated without time dummies, the positive effect of median age on pension expenditure is indeed significant while the negative effect on benefits per retiree becomes insignificant. The positive relation between aging and pension expenditure relative to GDP indicates that multicollinearity may have been present. As long as time effects are deemed relevant for explaining government spending they cannot be omitted in the baseline regression, however; omitting relevant variables leads to biased estimators.

Thus far the median age of the population has been used as the operationalization of aging. The median age is indeed the key factor in the political-economic literature. There are however other notions of aging in the broader pension literature, in particular the dependency ratio. This ratio gives the number of people older than 64 year for each 100 persons of working age (15-64 year). This figure is prominent in many discussions as it gives the proportion between the elderly and the working people "supporting" them. The conclusions for this alternative operationalization of aging indeed differ substantially, as Table 4 indicates. Now the demographic variable -here the dependency ratio- has a positive and significant effect on expenditure and an insignificant effect on generosity of benefits. This underlines that the median age and the dependency ratios are different entities. The latter is a better measure for the relative number of retirees, which explains why it is positively associated with pension expenditure. When more people are eligible for pension

benefits, total spending will automatically increase. In median voter models, the median age is the crucial political variable, as that captures the theorized political clout of elderly. To disentangle the two effects, both variables are also jointly used as regressors. In this regression both variables have positive coefficients in both regressions, but only the effect of the dependency ratio on total pension expenditure (relative to GDP) is significant.

Policy changes may need some time to respond to the political influence exercised by the median voter. First a government is elected and installed and thereafter it usually takes a considerable time to design, implement and actually execute a reform. For that reason a lagged value of the median voter is considered. As can be seen, the sign of the estimated effects remains the same but now the effects in both regressions are insignificant. One explanation is that using lagged values diminishes the number of observations; lagged values of the variables are not available for 1980. The number of observations decreases to 92, which may be too low to estimate fourteen parameters.

The baseline regression is estimated with 109 observations. When fewer regressors are used, more observations can be considered however. When the omitted variables are relevant (as we expect) this generally leads to biased estimates. Such biased estimations can be useful nonetheless as their standard errors are smaller due to the increased number of observations. Regressions with 155 observations but fewer covariates again lead to similar conclusions as the baseline regressions.

The base-line regressions are also re-estimated using lagged values of unemployment instead of contemporaneous values of unemployment. This specification addresses the possible endogeneity of unemployment. Unemployment may not only affect pension expenditure but may itself also be influenced by it. Higher spending on pensions may lead to either higher employment (as spending boosts aggregate demand) or to lower employment (as higher taxes may discourage workers).

Table 4.

VARIABLES	GDP spending	Benefits / retiree	GDP spending	Benefits / retiree	GDP spending	Benefits / retiree
Median age	0.258***	-0.013			0.217*	0.022
	(0.082)	(0.012)			(0.117)	(0.017)
Unemployment	0.151***	0.021***	0.108**	0.010	0.061	0.0022
	(0.036)	(0.005)	(0.043)	(0.007)	(0.073)	(0.011)
GDP per capita	0.152	1.174***	0.568	0.737***	-0.697	0.834***
	(1.037)	(0.153)	(1.206)	(0.203)	(1.385)	(0.200)
Union density	0.039**	0.005**	0.036**	0.007***	-0.014	-0.002
	(0.016)	(0.002)	(0.015)	(0.003)	(0.010)	(0.002)
Government ideology	-0.026	-0.003	-0.060	-0.006	0.284**	0.042**
	(0.067)	(0.010)	(0.061)	(0.010)	(0.130)	(0.019)
Minority government	-0.672**	-0.103**	-0.372	-0.095**	-0.365	-0.058
	(0.284)	(0.0418)	(0.263)	(0.044)	(0.467)	(0.067)
Single government	0.314	0.059	0.295	0.051	-0.887**	-0.116**
	(0.293)	(0.043)	(0.263)	(0.044)	(0.400)	(0.058)
Interest rate	-0.018	-0.005	0.013	0.004	0.072	0.015
	(0.047)	(0.007)	(0.050)	(0.008)	(0.104)	(0.015)
Median age (lagged)						
Dependency ratio			0.200***	-0.005	0.306***	0.015
			(0.039)	(0.007)	(0.075)	(0.011)
Unemployment (lagged)						
Year 1985			0.461	0.092*	0.040	0.022
			(0.304)	(0.051)	(0.702)	(0.101)
Year 1990			0.573	0.126*	-0.209	-0.032
			(0.393)	(0.066)	(0.756)	(0.109)
Year 1995			0.860	0.186**	-0.135	-0.005
			(0.548)	(0.092)	(0.932)	(0.135)
Year 2000			1.075	0.256**	-0.389	-0.041
			(0.674)	(0.113)	(1.057)	(0.153)
Year 2005			1.158	0.287**	-0.305	-0.024
			(0.793)	(0.133)	(1.193)	(0.172)
Constant	-6.429	-2.371*	-6.689	1.437	-1.858	-0.378
	(9.453)	(1.392)	(12.310)	(2.067)	(14.020)	(2.023)
Observations	109	109	109	109	109	109
R-squared	0.499	0.765	0.635	0.778	0.527	0.512
Number of countries	21	21	21	21	21	21

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4. (continued)

	GDP spending	Benefits / retiree	GDP spending	Benefits / retiree	GDP spending	Benefits / retiree
Median age			0.217**	-0.011	0.115	-0.051***
			(0.105)	(0.019)	(0.113)	(0.015)
Unemployment	0.096*	0.013	0.148***	0.0170**		
	(0.057)	(0.008)	(0.041)	(0.007)		
GDP per capita	-0.865	0.855***	-0.630	1.067***	-2.910**	0.608***
	(1.665)	(0.242)	(1.042)	(0.186)	(1.129)	(0.149)
Union density	0.042*	0.004			0.053***	0.007***
	(0.024)	(0.004)			(0.017)	(0.002)
Government ideology	-0.047	0.005			-0.027	-0.005
	(0.080)	(0.012)			(0.069)	(0.009)
Minority government	-0.498	-0.095*			-0.577*	-0.087**
	(0.329)	(0.048)			(0.297)	(0.039)
Single government	-0.034	0.037			0.088	0.030
	(0.375)	(0.055)			(0.307)	(0.041)
Interest rate	0.0138	0.005			0.0134	0.001
	(0.074)	(0.011)			(0.059)	(0.008)
Median age (lagged)	0.017	-0.004				
	(0.026)	(0.004)				
Dependency ratio						
Unemployment (lagged)					0.022	-0.005
					(0.039)	(0.005)
Year 1985			-0.006	0.045	0.729**	0.214***
			(0.348)	(0.062)	(0.352)	(0.046)
Year 1990	0.517*	0.014	0.459	0.078	1.222**	0.321***
	(0.304)	(0.044)	(0.454)	(0.081)	(0.512)	(0.068)
Year 1995	1.027**	0.0516	0.459	0.103	1.983***	0.459***
	(0.493)	(0.072)	(0.605)	(0.108)	(0.608)	(0.080)
Year 2000	1.500**	0.105	0.557	0.095	2.410***	0.596***
	(0.686)	(0.010)	(0.783)	(0.140)	(0.841)	(0.111)
Year 2005	1.845**	0.132	0.555	0.115	2.889***	0.682***
	(0.851)	(0.124)	(0.957)	(0.171)	(0.972)	(0.128)
Constant	11.830	0.473	3.579	-1.318	28.100**	4.335***
	(16.880)	(2.457)	(10.630)	(1.901)	(11.830)	(1.562)
Observations	92	92	155	155	112	112
R-squared	0.423	0.706	0.441	0.702	0.483	0.812
Number of countries	21	21	30	30	21	21

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

V. Discussion and conclusion

This paper has tested the hypothesis that an older median voter leads to more generous pensions. The overall conclusion is that an increase in the age of the median voter does not lead to more generous pensions. If anything, it leads to lower pensions. Considering health care spending instead of pension expenditure leads to similar conclusions. So the main prediction of median voter models, that a greying median voter will successfully push for higher benefits, is not supported.

It is even questionable whether an older median voter leads to more pension expenditure relative to GDP. In the baseline model, this is not the case. There is however a positive, significant effect when time effects are omitted or when the dependency ratio is considered as an alternative proxy for aging. The latter is in line with expectations, as more people are entitled to pension benefits. It is also in line with preferences of a majority of West-European voters, Boeri et al. (2002).

The results challenge the prominent role attributed in the theoretical literature to the median voter in both explaining and predicting welfare state changes. Apparently the median voter model does not fully capture the political process determining pension benefits. Other factors, off-setting the increased potential political clout of retirees, are important. Two theoretical approaches that can explain rising total expenditure and decreasing generosity are probability voting and models with endogenous labor supply. The empirical results here indicate that unions have a significant effect on political outcomes. Integrating these theoretical insights and empirical outcomes, is warranted for a better understanding of the effect of demography on the financial sustainability of social security.

References

Armingeon, K. S. Engler, P. Potolidis, M. Gerber and P. Leimgruber (2010), *Comparative Political Data Set 1960-2008*, Institute of Political Science, University of Berne.

Boeri, T., Boersch-Supan, A., Tabellini, G., (2002) 'Pension reforms and the opinions of European Citizens' *American Economic Review* 92 (2), 396--401.

Boldrin, M. and A. Rustichini (2000), 'Political Equilibria with Social Security', *Review of Economic Dynamics*, 3, 41-78.

Breyer, F. and B. Craig (1997), 'Voting on social security: Evidence from OECD countries', *European Journal of Political Economy*, 13, 705-724.

Breyer, F. and K. Stolte (2001), 'Demographic change, endogenous labor supply and the political feasibility of pension reform', *Journal of Population Economics*, 14: 409-424.

Browning, E. K. (1975), 'Why the Social Insurance Budget is Too Large in a Democracy', *Economic Inquiry*, 13(3), 373-388.

Castles, F. G. (2004), The Future of the Welfare State. Crisis Myths and Crisis Realities (Oxford University Press).

Conesa, J. C. and D. Krueger (1999), 'Social Security Reform with Heterogeneous Agents', *Review of Economic Dynamics*, 2, 757-795.

Cooley, T. F. and J. Soares (1999), 'A positive Theory of Social Security Based on Reputation', *Journal of Political Economy*, 107 (1), 135-160.

Disney, R. (2007), 'Population ageing and the size of the welfare state: Is there a puzzle to explain?', *European Journal of Political Economy*, 23(2), 542-553.

Galasso, V. (2006), 'The Political Future of Social Security in Ageing Societies' (*MIT Press*: Cambridge MA).

Galasso, V. and P. Profeta (2002), 'The political economy of social security: a survey', *European Journal of Political Economy*, 18, 1-29.

Gonzales-Eiras, M. and D. Niepelt (2007), 'The Future of Social Security', Study Center Gerzensee Working paper 07.02.

Meara, E., C. White and D. M. Cutler (2004), 'Trends in Medical Spending By Age, 1963-2000', *Health Affairs*, 23(4), pp. 176-183.

Mulligan, Gil and Sala-i-Martin (2002), 'Social Security and Democracy', *NBER working paper* 8958.

Persson, T. and G. Tabellini (2000), 'Political Economics' (*MIT Press*).

Razin, A., E. Sadka and P. Swagel (2002), 'The Aging Population and the Size of the Welfare State', *Journal of Political Economy*, 110(4), 900-918.

Sanz, I. and F. J. Velazquez (2007), 'The role of ageing in the growth of government and social welfare spending in the OECD', *European Journal of Political Economy*, 23(4), 917-931.

Shelton, C. A. (2008), 'The aging population and the size of the welfare state: is there a puzzle?', *Journal of Public Economics* 92, pp. 647-651.

Sjoblom,K. (1985), 'Voting for social security', *Public Choice* 45: 225-240.

Tabellini, G. (2000), 'A positive theory of Social Security', *Scandinavian Journal of Economics* 102 (3), 523-545.

Tepe, M. and P. Vanhuysse (2009), 'Are Aging OECD Welfare States on the Path to the Politics of Gerontocracy? Evidence from 18 Democracies, 1980-2002', *Journal of Public Policy*, 29(1), 1-28.